

NOTES AND DESCRIPTIONS TAKEN FROM SELACHIANS IN THE  
U. S. NATIONAL MUSEUM

By S. GARMAN.

*Myliobatis Goodei*, sp. n.

Disk about two-thirds as long as broad; lateral angles acute, bluntly rounded at the apices; posterior angles of pectorals nearly right. Snout very broad, short, with a slight prominence in front. The fin, or flange, beneath the eye at the side of the head is very wide, much wider than in either *M. freminvillei* or *M. californicus*. Eyes very small, without a prominence above in either male or female (immature specimens). Tail less than twice and more than one and two-thirds times the length of the disk. Dorsal fin smaller than that of *freminvillei*. Teeth in seven series, much shorter and narrower than those of *freminvillei*, third row about twice and middle row about four times as wide as long. Body smooth. Entire length 29, snout to end of ventrals 11.5, vent to end of tail 18.5, and width of disk 17.5 inches.

Olivaceous, darker on the center; white below. The Museum of Comparative Zoology has a large specimen which agrees well with this description.

Compared with *M. freminvillei*, this species has very small eyes; the pectoral below the orbit is wider than the eyeball, and the fin in front of the skull is but little wider than at its sides. In *freminvillei* the eyeball is twice as wide as the fin beneath it, and the fin in front of the skull is much wider than below the eye. Comparing specimens of about the same size, of both sexes, of *freminvillei*, *californicus*, and *goodei*, the latter is readily distinguished from the former two by the broad flange at the side of the head, the small eyes, the small teeth, and the broader lateral angles of the pectorals.

No. 9524 ♂, 9529 ♀. Central America.

Named for Professor G. Brown Goode.

*Myliobatis freminvillei*, Les.

Eyes about twice as large as those of *M. goodei* of the same size. The expansion of the pectoral below the eye is very narrow, a mere ridge, not half as wide as the same portion in Goode's ray. The pectoral near the acute outer angles is much narrower than in that species. The teeth are longer, and the median row is as wide as four of the next laterals. In *M. goodei* the teeth are much shorter and the median row is only about twice as wide as the next laterals, which in turn are about twice the width of the outer rows.

No. 14858, Noank, Conn. Total length 25.6, snout to ventrals 8.1, and width 14 inches.

No. 19482, east shore of Virginia. Entire length 25, snout to ventrals 8, and width 14.2 inches.

*Dasybatus pastinaca*, (Klein) Walbaum, 1793, *Kleinii Ichthyol. Enod.*, p. 35.

Disk broad, four-fifths as long as wide; pectoral angles considerably in advance of the mid-length of disk; rostral angle very wide, tip of snout produced in a point beyond the balance of the margin. Center of body thick. Tail about one and a half times the length of the disk, with a narrow membrane or keel beneath. The body and tail are without asperities in this, a very young specimen. Mouth undulating, curved forward. Eyes rather small, smaller than the spiracle. Nostrils and nasal valves dark. Teeth small, blunt. Three elongate papillæ at the bottom of the mouth, close together. Color olivaceous brown, margins lighter, tail darker; light beneath.

Total length 17.5; tail 10; and width 9.5 inches.

Young male. No. 26507. No locality.

*Dasybatus kuhlii*, sp. M. & H.

Disk broadly rounded in front, snout not prominent—included in the broad curve of the anterior margin, lateral-posterior margin nearly straight. Margin of disk in front of head rather thick. Eyes prominent; orbit as large as the spiracle. Interspiracular distance equal distance of eye or mouth from tip of snout. Mouth small, curved; width equal more than half the distance from the end of the rostrum. Upper jaw forming an angle in front; symphysis turned downward; two papillæ on the floor of the mouth. Tail about one and a half times the length of the disk, with a short low cutaneous fold close behind the tip of the spine and a longer broader one below extending backward from near the spine's base; this fold grows narrower backward, but is continued nearly or quite to the extremity.

Olivaceous, uniform or with one or more rounded dark-edged small spots of light color over the posterior portions of the pectorals; white beneath. Tail darker behind the spine, with broad bands of white toward the end.

Total length 15.5; snout to end of pectorals 6.5; snout to end of ventrals 7.5; snout to mouth 1.1; and width 8 inches.

No. 26519. No locality.

*Dasybatus*, sp.

Fœtus 7 inches in length, of which 5 is tail. Snout and pectorals rounded, former not prominent. Tail with a membranous expansion above and another below, the latter wider and longer.

No. 26544. Japan.

*Dasybatus varidens*, sp. n.

Disk broad, four-fifths as long as broad, angles bluntly rounded. Snout blunt, without a prominence. Eyes rather large, larger than the spiracles. Mouth medium; its outline appearing as if the middle third of its length had been set forward a short distance ahead of the other two-thirds. On the upper (anterior) jaws the teeth at each end of this middle third, in the angles, are larger, triangular and pointed. Two

papillæ on the floor of the mouth. Tail one and a third times the length of the disk—from snout to end of ventrals, with a long narrow fold on the lower side—under and behind the spine, and a short but prominent one on the top, just behind the tip of the spine. The pectoral angles are nearly opposite the middle of the length of the disk. In this specimen, a young male, the disk is without asperities.

Entire length fourteen inches; disk about six; width seven and a half.

Color, rather light reddish brown or olivaceous; tail encircled by white rings, the broadest near the end. The species resembles *D. kuhlii*, but has a broader disk and no spots.

No. 6529. Hong-Kong, China.

This ray would be placed in the section *Hypolophus* with *D. sephen*. Excepting the angular outline of the mouth and the larger teeth in the angles of this outline in the upper jaw, there is little to separate this from other *Dasybati*.

***Urolophus nebulosus*, sp. n.**

Disk subround, resembling that of *U. halleri*, with asperities about the middle over the posterior portion of the abdominal cavity. Without a median series of tubercles on back or tail. Three small papillæ at the bottom of the mouth. In shapes of body and caudal closely allied to *U. halleri*.

Entire length 12, snout to ends of ventrals 7.5, to ends of pectorals 7, and width 7 inches.

Clouded olivaceous above; whitish below.

No. 7356; Colima, Mexico.

A specimen of *U. halleri* measures in entire length 13, snout to ends of ventrals 8.4, to ends of pectorals 7.4, and width 7.4 inches.

***Urolophus torpedinus*, Desm.; M. & H.**

Fœtus, length 5 inches. The membranous flap from above the upper posterior portion of the orbit forms a broad cover for the spiracle. It is quite as large as the spiracle, rounded above and produced in an acute angle extending behind the opening. The spiracular opening is an elongate slot and the valve is well developed.

Very light olivaceous freckled with brown. Posterior half of tail obscurely ringed with brown and lighter color.

Specimen 8184. New Jersey.

***Urolophus fuscus*, sp. n.**

Disk smooth, subquadrangular, hardly as broad as long, forming a blunt angle in front, tip of snout prominent. The tail from the vent equals the distance from the same point to the anterior edge of the nostril, expansions of fin medium, tip blunt, insertion of spine a little anterior to the middle of the length from the vent. Ventrals medium. Claspers short, stout. Eye small, orbit as long as spiracle, interorbital space as wide as mouth, which is less than half the distance of the latter

from the tip of the snout. Mouth medium, curved forwards, with three papillæ on its floor—middle one bifurcate at its tip.

Entire length,  $12\frac{1}{2}$  inches; snout to hinder edge of vent, 7; snout to mouth,  $1\frac{8}{10}$ ; snout to end of ventrals, 8; width,  $7\frac{8}{10}$ .

Color, apparently uniform light reddish brown or olive. The shape of this specimen resembles that of *Dasybatus pastinaca*. The species is near *U. cruciatus*, which is broader than long, and of which the snout does not project.

No. 7058. Off east coast Nippon.

Another specimen, 26543, also from Japan, has a total length of  $5\frac{1}{2}$  inches, snout to vent  $2\frac{3}{4}$  and to end of ventrals  $3\frac{1}{4}$ , and a width of disk of  $3\frac{5}{8}$ .

This appears to be the young of 7058. There are differences: the snout is not prominent; the disk is wider in proportion to its length, more broadly rounded, and retains its greater width posteriorly; and the color is darker. The larger specimen, however, is faded, and the other differences are such as age renders less patent.

*Narcine timlei*, Bl. Schn.; Henle.

Very young specimen. Vent in the middle of the total length. Insertion of dorsal slightly behind the bases of the ventrals. Caudal with a blunt angle opposite the end of the vertebral column.

Light brown, thickly freckled with darker. Large blotches of darker between eye and lateral margin, between shoulder and lateral margin, and between the spiracles; there is one near the pelvis on each side of the dorsal median line, and one between each of these and the lateral margin. There is also a spot on each side of the base of each of the dorsals and one on the base of the tail. The upper portions of the fins are darker.

No. 26545. Hong-Kong, China.

*Raja fusca*, sp. n.

Specimens taken from the egg-case. Disk three-fourths as long as wide. Snout moderately prominent. General outline similar to that of *R. ocellata*. Tail from vent equals the length of the disk including the ventrals, depressed, rather broad, at the dorsals, behind which it extends in a long point that probably is much reduced in comparative length in the adult. Teeth in thirty series. Eyes moderate, interorbital space nearly half their distance from the end of the snout. Mouth broad, with a slight forward curve. A pair of large spines in front of each eye; a single spine above each spiracle; one behind the head on the anterior end of the vertebral column, sometimes a second behind this on the shoulder girdle, and a median row on the tail beginning behind the vent, and reaching the second dorsal. Dorsals separated by two spines. Excepting these spines, the back is smooth.

Light reddish brown. A black ring about half as wide as the mouth incloses a lighter colored space near the shoulder girdle on each pectoral.

Length  $4\frac{3}{4}$ , width 2, and length of pectorals  $1\frac{1}{2}$  inches.

No. 26542. Japan.

*Raja senta*, sp. n.

Shape of disk resembling that of *R. eglanteria*. Snout extending beyond the angle formed by the anterior margins of the pectorals, acute and flexible at the tip. Interorbital space concave, narrow, three and two-thirds times in the distance from the eye to the end of the snout. Mouth moderately wide, nearly twice in the pre-oral length, very little curved forward. Eyes and spiracles small. Teeth in thirty-six to forty series. Tail slender, tapering gradually, as in *R. granulata*, but a little more depressed than in that species; it does not extend behind the tip of the dorsal. Entire upper surface covered with very small, closely set, sharp spines. Each spine is slender, acute, and strongly hooked backward over a broad stellate base. A series of large spines on the vertebral line, interspersed with smaller ones, becoming very small on the posterior half of the tail. A group of two or three large hooked spines in front of each eye, a similar group above each spiracle, and another on each shoulder. Tail covered with the fine scales above, below, and on the sides. A few spines of small or moderate size on the anterior portion of the rostral cartilage and across the back of the head. The long, narrow dorsals are not separated by spines.

Olivaceous, clouded with darker. A white spot on the middle of the back, behind the shoulder girdle. A white band across the tail, at the ends of the ventrals.

No. 24309. Provincetown, Mass. Entire length 11.5, snout to ends of pectorals 7, and tail from vent 6 inches.

No. 21004. Le Have Bank. A deep-water species. The color of the larger specimen is a rather light reddish brown, apparently uniform.

*Raja Jordani*, sp. n.

Disk broader than long; little sharper than a right angle in front. Snout pointed, rather sharp and narrow at the end. The width of the disk is about one and a half times the length of the tail from the ventrals. Anterior margin of pectoral undulated, little concave. Width of posterior lateral portion of pectoral—parallel with the margin—about equal to distance from snout to shoulder girdle. Outer angle of pectoral behind the mid-length of the disk; posterior angle rounded. Tail moderately slender, tapering regularly to a point, depressed. Dorsals separated by a large spine; posterior supplemented by a membranous expansion on the top of the extremity of the tail. Interocular space broad, deeply concave, three times in the distance from the eye to the end of the snout. Eye moderate, as large as the spiracle. Mouth wide, curved forward, one and two-thirds times in its distance from the end of the snout. Teeth sharp-pointed, in thirty-eight rows. On the rostral cartilage, the skull, the translucent rostral spaces, and along the anterior margins of the pectorals the skin is rough with small spines. A row of larger spines along the orbital ridges and the median line of back



and tail. No lateral series of large spines on the tail on this specimen, a male. A couple of large spines side by side in front of and near the dorsals, somewhat as in *R. clavata*. A group of large spines on the anterior extremity of each pectoral and a single row of retractile hooks on each near the outer angle. The greater portion of the disk is smooth. The claspers are long, slender, tapering, acutely pointed. Instead of bearing a sickle-shaped hook on its extremity, as in *R. erinacea*, the stylus of the clasper is forked and one of the slender branches becomes pointed and flexible and the other curved, expanded at the end, and sharp edged.

Total length 23; snout to vent, 11.5; snout to shoulder girdle, 6.75; snout to mouth 3, and greatest width 15.5 inches.

Color dark olivaceous, lighter toward margins, with white or translucent spaces at each side of the rostrum. Mottled and spotted with dark beneath the thoracic region. A rounded spot of light color around a dark center on each pectoral near the shoulder.

No. 16704. San Francisco, Cal.

Named for Prof. D. S. Jordan.

#### A REVIEW OF THE AMERICAN SPECIES OF FLYING FISHES (EXOCÆTUS).

By DAVID S. JORDAN and SETH E. MEEK.

In the present paper we have attempted to give the synonymy of the American species of *Exocætus*, with an analytical key by which those known to us may be distinguished. Some of the less-known forms we have described in detail.

There are few groups of fishes in which our knowledge is in a more confused state than in this. It is our hope that the present paper will, at least, not make matters worse. This paper is in some regards supplementary to that of Dr. Lütken (Vidensk. Meddel. Naturh. Foren. 1876), which is the only critical review of the species of this group thus far published.

It is evident that few, if any, of the flying-fishes are local in their distribution; many of them are certainly found in all warm seas. Several of the supposed East Indian forms will doubtless prove, on further comparison, to be identical with Atlantic species.

The multiplication of nominal species on characters peculiar to immature individuals has been carried to an unfortunate extreme. It is to be earnestly hoped that future writers who may possess specimens of bearded *Exocæti*, or of other young flying fishes of less than 5 or 6 inches in length, will content themselves with describing such specimens without imposing on them any new specific names. The changes due to increased age are often remarkable, and, in most cases, the supposed characters of species based on young specimens are characters of immaturity, common to the young of many flying fishes.